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STATE OF WASHINGTON

No. 80214-9

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WASHINGTON STATE SUPREME COURT

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JEFF GRIFFIN,  
Petitioner,

v.

THURSTON COUNTY and its BOARD OF HEALTH,  
Respondent

and

BRUCE CARTER, SHARI RICHARDSON, GEORGIA BICKFORD,  
BARBARA BUSHNELL and JANE ELDER BOGLE,  
Interested Parties.

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THURSTON COUNTY'S SUPPLEMENTAL BRIEF

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## I. INTRODUCTION

At issue in this case is whether an application for an on-site sewage system permit that cannot meet a fundamental health code requirement – minimum lot size<sup>1</sup> – can be approved by obtaining waivers from other health code requirements. In other words, is an applicant for a permit on an undersized lot limited to essentially one waiver – the waiver from minimum lot size – or may he also seek waivers from other county and state requirements.

The Thurston County Sanitary Code (TCSC) provision at issue, TCSC Article IV, § 21.4.5, provides the health officer discretion to approve or deny an on-site septic system on a parcel of land that does not meet the minimum lot size “if the proposed system meets *all requirements of these regulations* other than minimum land area.”

When the language of the applicable code provision is construed under the rules of statutory construction, it becomes clear that the plain meaning of the words “all requirements,” as used in Article IV, § 21.4.5, precludes an undersized lot applicant from obtaining additional “waivers” from code requirements. This interpretation gives effect to all the language used in the TCSC Article IV, and does not render any portion

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<sup>1</sup> “Minimum lot size is designed to protect public health and prevent environmental degradation.” AR 162 (Washington State Department Rule Development Committee Issue Research Report-Lot Size (Minimum Land Area)(2002).

meaningless or superfluous. Further, interpreting “all requirements” to preclude waivers for undersized lot applicants is a reasonable construction considering the Thurston County Sanitary Code’s purpose of protecting public health.

The administrative hearing officer, the Thurston County Board of Health (“Board”) and the Court of Appeals properly ruled that Article IV, § 21.4.5 precludes a small lot applicant from obtaining a waiver from other state and county requirements. Furthermore, on the facts of this case, the administrative hearing officer, Board of Health and Court of Appeals correctly denied Griffin’s on-site sewage system (“OSS”) application for an undersized lot because he had received *at least* two waivers from other state and County regulations.

Thurston County (“County”) adopts by reference all arguments submitted to the Court of Appeals and this Court by Respondent Bruce Carter.

## **II. STATEMENT OF THE CASE**

### **A. Minimum Lot Size Requirements For On-Site Sewage Systems (OSS) Are Designed To Protect Public Health And Prevent Environmental Degradation.**

A fundamental public health concern in locating an on-site sewage system is to insure that there is minimum land area to treat the sewage before it reaches the groundwater and/or surface water. AR 159.

Minimum lot size requirements have changed little in Washington State since state on-site rules were first established in 1974. AR 159 The minimum land area for on-site sewage systems under the Washington State and Thurston County regulations ranges from a minimum of 12,500 square feet to 2 acres, depending on soil type and water supply. TCSC Article IV, § 21; WAC 246-272-20501.

In 2002, the Washington State Department of Health (“DOH”) reviewed whether or not it needed to make changes in current lot size requirements. AR 159-161 Washington State Department Rule Development Committee, *Issue Research Report-Lot Size (Minimum Land Area)(2002)* (“Report”) attached as Appendix A.

The Report describes the public health significance of minimum lot sizes as follows:

- Properly designed, sited and installed and maintained on-site systems will remove bacterial and viral pathogens before the effluent reaches the groundwater. **Remaining contaminants such as nitrates, chlorides and any organic solvents placed into the system usually depend on dilution to protect the groundwater.** Lot size will affect the amount of dilution of the remaining contaminants in the effluent as it leaves the soil envelope before, or as it mingles with, the groundwater. AR 160.
- The minimum lot size criteria was based on what was needed to properly treat and dispose of the sewage and on the ability to fit the necessary items on the lots while meeting setback requirements. AR 161.
- In review articles, Brown and Bicki (1987) and Bicki and Brown

(1991) conclude that most studies on the correlation between groundwater contamination and OSS density estimate a minimum lot size necessary to ensure against contamination is roughly 0.5 to 1 acre. AR 161.

- Since minimum lot size is designed to protect public health and prevent environmental degradation, in terms of protecting these assets, **it does not matter whether the lot is one of record or has been newly created.** AR 162 (Emphasis supplied).

Despite the advances in on-site sewage system technology, the conclusion of the Report, after reviewing scientific literature on this issue, was to continue to require the minimum lot size of 12,500 sq. ft which correlates to 3.5 unit volumes of sewage per acre or 3.5 residences per acre. AR 163 and TCSC Article IV, § 21.2.6.

B. Griffin's Undeveloped Lot Is 77% Smaller Than The Minimum Lot Size Deemed Necessary To Protect Public Health.

In this case, Griffin is proposing to build a 1200 square foot home on his undeveloped lot, Lot 11. AR 125-129. Griffin's lot is 77% smaller than the minimum lot size mandated by state and county regulations for new development that uses an OSS for sewage disposal. AR 7. An on-site sewage system on this lot would equate to 15.3 units of sewage per acre, while the public health standards for new development in Washington, as discussed above, allow a maximum of 3.5 unit volumes of sewage per acre. AR 43 and 197.

Nonetheless, on November 19, 2004, Griffin submitted a project



application to install a new on-site sewage system for a one bedroom house on an undeveloped and undersized lot. AR 14. Because Griffin's property is not big enough to meet the minimum lot size specified in TCSC Article IV, he requested approval to install an on-site sewage system on a lot that does not meet the minimum land area requirements. AR 22. In addition, and among other reductions<sup>2</sup>, Griffin requested and received approval for two waivers. AR 1; AR 9-10; AR 18, 21-22 and AR 38.

C. In Addition To Requesting Approval To Develop An Undersized Lot, Griffin Requested And Received Two Waivers Pursuant To TCSC Article IV, § 24.

In its report to the Board, the health officer described Griffin's two waivers as follows:

Waiver Requirements:

Article IV allows an applicant to seek approval of a deviation from specific on-site sewage system designs (sic) requirements by applying for a waiver. Waiver requests are considered on a case-by case basis in accordance with section 24.1.2.

Section 24.1.2 of Article IV allows the Department to approve waivers from specific requirements for a sewage system providing:

a strict interpretation of Article IV will result in significant hardship;

the waiver application contains justification describing how the requested waiver is consistent with the purpose and objectives of

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<sup>2</sup> See AR 38-39 (Hearing Officer's Findings) for a detailed discussion of the other reductions.

Article IV to meet the public health intent;

and the waiver is consistent with the standards in and the intent of Article IV.

...

1. Waiver from Requirement for Winter Water Evaluation

The appellant [Griffin] applied for a waiver (Exhibits D [sic]) from Department policy (Exhibit E) on determining the elevation of the highest seasonal water table as required by Article IV, section 11.4.1. The waiver sought an exemption from the requirement to conduct a winter water study.

...

2. Waiver from Setback for Water Supply Line

The applicant [Griffin] applied for a waiver (Exhibit F (AR 21) to reduce the setback from the septic tank and pump chamber to the water supply line for the proposed residence from the standard ten (10) feet to five (5) feet. The minimum setback of 10 feet is required by Article IV, section 10, Table I.

AR 9-10.

The statutory authority and regulations pertaining to waivers for on-site sewage systems is found in RCW 70.05.072, WAC 246-272-25001, and TCSC Article IV, § 24.

In this case, Griffin requested a waiver from the state regulation, WAC 246-272-09501(1), and TCSC Article IV, § 10.1, Table 1, requiring a ten foot setback between the septic tank and the pressurized drinking water line. AR 21. Griffin submitted a state prescribed waiver form requesting that this setback be reduced to five feet. AR 21. Griffin provided certain mitigation measures to justify his waiver request, such as

water proofing tanks, flex couplings at tank connections, and a tank leakage test. AR 21. The health officer processed Griffin's waiver request as a class A waiver. AR 21. AR 234 (Testimony of Steve Peterson, Environmental Health Division). Because Griffin's proposed mitigation measures satisfied the DOH pre-approved mitigation measures, the health officer approved Griffin's request. AR 21 and AR 234 (Testimony of Steve Peterson, Environmental Health Division).

Griffin also requested a waiver from the TCSC Article IV, § 11.4.1 requirement for a winter water study. AR 18. Griffin, through his representative, Lane Sater, submitted a state-prescribed waiver form requesting that the winter water study be waived. *Id.* Griffin provided additional information through a soil scientist's report to justify his waiver request. AR 18. The health officer also approved this waiver request, but because it was a waiver of local health policies, and not a state regulation, it was not sent to the state. *Id.*

In Griffin's pursuit to install a new on-site sewage system on his undeveloped lot, he requested (1) approval to install an on-site sewage system on a lot 77% smaller than the minimum lot size; AR 39 (2) a waiver from a state regulation requiring a 10 foot setback from the septic tank to the pressurized drinking water line; AR 38 (3) a waiver from the Sanitary Code's requirement for a winter water study; AR 38 (4) three

other setback reductions; AR 38 and (5) a 50% reduction in design flow.

AR 38. The health officer approved the on-site sewage system. AR 22, and 37. Respondents Bruce Carter, et al., timely filed an appeal of this approval to the administrative hearing officer. AR 47-52.

D. The Administrative Hearing Officer, The Board Of Health And The Court Of Appeals All Determined That Under TCSC Article IV, § 21.4.5.3, An Applicant For An Undersized Lot Cannot Meet "All Requirements" If He Has Obtained Other Waivers.

On appeal, the administrative hearing officer made the following conclusions and reversed the approval of Griffin's permit for an on-site sewage system:

3. The principal decision in this case is whether the health officer should allow a substantial number of waivers and setback reductions in order to allow the development of a small waterfront lot. . . . Article IV gives the health officer considerable discretion when deciding whether to approve on-site systems on lots that fail to meet the minimum land area provisions of Article IV. . . . Section 21.4.5 states the health officer may permit the installation of an on-site sewage system providing other permit criteria are satisfied.

4. When looking at Section 21.4.5 and the permitting of on-site systems on undersized lots, it must be recognized that minimum land area and density are significant public health issues. It is well recognized that even properly operating on-site systems discharge pollutants that can be detrimental to public health at some concentration. To address this issue public health regulations limit the density of on-site sewage systems. In Washington, new developments are limited to a maximum number of 3.5 homes per acre served by on-site sewage systems under ideal conditions. This correlates to a minimum lot size of 12,500 square feet.

5. For the permit in question the applicant proposes to build a residence on a 2850 square foot lot. This represents a density of approximately 15.3 units per acre, which is well in excess of the maximum of 3.5 units per acre allowed for new subdivisions. This suggests that the other code provisions should be rigorously applied when minimum land area requirements are set aside.

...

10. The health officer should not have approved the permit for an on-site sewage system on a lot that does not meet the minimum land area requirements or lot size because all requirements of Article IV other than minimum land area could not be met, as discussed above.

AR 43-44.

Griffin appealed the administrative hearings officer's decision to the Thurston County Board of Health . AR 1. The Board denied the appeal, adopted the administrative hearing officer's findings and conclusions, and upheld the denial of the on-site sewage system permit.

AR 1-4. The Board's decision, like the hearing officer's decision, was based on the fact that Griffin could not satisfy Section 21.4.5 of the TCSC.

AR 3. The Court of Appeals affirmed the Board of Health's interpretation. *Griffin v. Board of Health*, 137 Wn. App. 609, 618, ¶ 17 (2007). Griffin sought discretionary review, which was granted by this Court on April 1, 2008.

### III. ARGUMENT

This Court accepted review "only on the issue of interpretation of

the Thurston County Sanitary Code.” Order, Supreme Court, No.80214-9 (April 1, 2008). The issue before this Court then is to determine whether or not an on-site sewage system, that is proposed to be placed on an *undersized lot*, has satisfied “all requirements” as used in Section 21.4.5.3 of Article IV, if it has obtained waivers from other code requirements. The hearing officer, the Board of Health and the Court of Appeals interpreted this language and unanimously concluded that the plain meaning of “all requirements” precludes an undersized lot applicant from obtaining waivers from other TCSC Article IV requirements.

A. Rules Of Statutory Construction.

The rules of statutory construction applicable to this case have been succinctly summed up as follows:

Interpretation of local ordinances is governed by the same rules of construction as state statutes. In considering an undefined term, the court considers the statute as a whole to give meaning to the term in harmony with other statutory provisions. Rules of construction do not apply when the language is clear and explicit. In interpreting statutes and ordinances, definitions contained within the act control the meaning of words used in that act. Courts must reasonably construe ordinances with reference to their purpose.

*HJS Dev., Inc. v. Pierce County*, 148 Wn.2d 451, 471-472 (2003)

(citations omitted).

While the Sanitary Code at issue in this case is a local ordinance, interpretation of this ordinance is governed by the same rules as state

statutes. *Id.* If the Court agrees that the plain meaning of the words “all requirements” in TCSC Article IV, § 21.4.5.3 precludes an undersized lot applicant from obtaining waivers to qualify for an on-site sewage system permit, then the rules of statutory construction do not apply. On the other hand, if the Court feels further inquiry is necessary, the Court should consider TCSC Article IV as a whole to give meaning to the term “all requirements” in harmony with other TCSC Article IV provisions. *Id.* Likewise, the Court should interpret and construe TCSC Article IV “so that all the language used is given effect, with no portion rendered meaningless or superfluous.” *Whatcom County v. Bellingham*, 128 Wn.2d 537, 546 (1996). Finally, the term “all requirements” should be reasonably construed with reference to the Code’s purpose of protecting public health. *HJS Dev., Inc.*, 148 Wn.2d at 472.

B. Under The Rules Of Statutory Construction, The Term “All Requirements” Precludes An Undersized Lot Applicant From Obtaining Waivers From Other TCSC Article IV Requirements.

1. UNDER THE PLAIN MEANING RULE, THE PHRASE “ALL REQUIREMENTS” PRECLUDES AN UNDERSIZED LOT APPLICANT FROM OBTAINING WAIVERS FROM OTHER CODE REQUIREMENTS.

At issue in this case is the interpretation of TCSC Article IV, § 21.4.5.3. Section 21.4 provides:

The health officer *may*:

...

21.4.5 Permit the installation of an OSS, where the

minimum land area requirements or lot sizes cannot be met,  
*only* when all of the following criteria are met:

...

21.4.5.3 The proposed system meets *all*  
*requirements* of the regulations other than minimum  
land area.

Emphasis added.

This code provision acknowledges that an applicant for an undersized lot can be excused from complying with the minimum land area requirement, only if the application meets all other requirements of TCSC Article IV. Thus, the obvious and plain meaning of “all requirements” precludes an undersized lot applicant from obtaining waivers from other TCSC Article IV requirements. This plain meaning becomes particularly clear when the waiver provision of TCSC Article IV, § 24.1.2 is examined. This section provides “the hearing officer . . . may grant a **waiver** from specific **requirements** in this article” pursuant to the procedure in TCSC Article I. Thus, an applicant can either satisfy the requirements of TCSC Article IV or seek a waiver. If a waiver is sought, the applicant has not met the requirements of the Code. Likewise, if all requirements are met, no waiver is necessary. Griffin acknowledges this plain reading of TCSC Article IV. As Griffin explained:

Article I, Section 13 explicitly permits any septic permit applicant to ask the County to waive the obligations to comply with any of the Code’s provisions. [Citation omitted.] Therefore, Article IV, Section 21.4.5.3’s requirement that a small-lot septic applicant



meet “all requirements” of the Code other than minimum lot size has a clear, logical meaning and application: **It precludes small-lot septic permit applicants from asking the County to waive any of the Code’s express requirements using Article 1, Section 13.**

Griffin’s Motion for Reconsideration at 7-8 (emphasis supplied); *See also* Griffin’s Petition for Review at 11. The administrative hearing officer also recognized the plain meaning of TCSC Article IV. As he expressed in his written decision:

6. [T]he development of the subject lot can only occur if a substantial number of waiver requests and horizontal setback reductions are also approved.

...

10. The health officer should not have approved the permit for an on-site sewage system on a lot that does not meet the minimum land area requirements or lot size because all requirements of Article IV other than minimum land area could not be met, as discussed above.

AR 44. The Board agreed with the hearing officer’s plain meaning interpretation and likewise concluded:

7. “All (other) requirements” means that an application for an OSS on a too-small lot should satisfy all requirements related to permitting at the time of application without having to result to waivers, setback adjustments or other modification of the rules found within the Code.

AR 3. The Court of Appeals also concurred with this plain meaning interpretation. *Griffin*, 137 Wn. App. at 618, ¶ 17.

2. INTERPRETING “ALL REQUIREMENTS” TO PRECLUDE WAIVERS FOR UNDERSIZED LOTS GIVES EFFECT TO ALL THE LANGUAGE USED IN TCSC ARTICLE IV, AND DOES NOT RENDER ANY PORTION MEANINGLESS OR SUPERFLUOUS.

The Court of Appeals recognized that the term “all requirements” must mean all requirements of TCSC Article IV without waivers, because any other meaning would have the effect of rendering section 21.4.5.3 meaningless and superfluous:

We must give effect to all provisions of an ordinance and may not interpret an ordinance in a way that renders a portion meaningless or superfluous. Under this principle, the “all requirements” portion of the ordinance at issue here cannot include “requirements” that have been waived or set back. If “all requirements” included waivers and setbacks, the language would be meaningless and superfluous. Every OSS petitioner, regardless of lot size is required to comply with the TCSC’s provisions or else obtain waivers and setbacks. Thus the phrase is meaningful only if the application’s sole deficiency is lot size. The Board properly construed the ordinance to mean that an undersized lot must meet “all requirements” without waivers and setbacks in order to trigger the health officer’s authority to exercise discretion and grant an OSS permit to an undersized lot.

*Griffin*, 137 Wn. App. 618-619, ¶ 17.

The Court of Appeals is correct. All on-site sewage systems, whether on standard-sized lots that meet minimum lot size, or on undersized lots, must comply with Article IV to be approved. If an application for an undersized lot is allowed to comply with Article IV by obtaining waivers from code requirements, just like a sewage system for a

standard-sized lot, Section 21.4.5.3 would have no meaning because the under-sized lot would not be treated any differently than the standard-sized lot. The result would render Section 21.4.5.3 superfluous.

To have any meaning, the “all requirements” language in Section 21.4.5.3 must impose a limitation on permitting on-site sewage systems on undersized lots. Specifically, this section precludes an undersized lot applicant from obtaining waivers.

The Court of Appeals’ interpretation is further reinforced by the rule of statutory construction which requires courts to reasonably construe ordinances with reference to their purpose. *HJS Dev., Inc.*, 148 Wn.2d at 472.

3. INTERPRETING “ALL REQUIREMENTS” TO PRECLUDE WAIVERS FOR UNDERSIZED LOT APPLICANTS IS A REASONABLE CONSTRUCTION CONSIDERING THE SANITARY CODE’S PURPOSE OF PROTECTING PUBLIC HEALTH.

The purpose of Article IV of the Sanitary Code is to protect the public health by “[m]inimizing the potential for public exposure to sewage from on-site sewage systems” and “[m]inimizing adverse effects to public health that discharges from on-site sewage systems may have on ground and surface waters.” TCSC Article IV, § 1.1. To this end, Article IV regulates the location and design of on-site sewage systems to “[l]imit the discharge of contaminants to waters of the state.” TCSC Article IV, § 1.1.

In protecting public health, the Board and local health officer are required to enforce the state public health statutes and the rules promulgated by the Washington State Board of Health and the Secretary of Department of Health ("DOH"). RCW 70.05.060(1). One of the significant public health rules that DOH has adopted, is to require a minimum lot size of 12,500 square feet, or 3.5 residences per acre. WAC 246-272-20501. This minimum lot size, after review of scientific literature, has been deemed the minimum necessary to protect public health and prevent environmental degradation. AR 161.

If an applicant is allowed to install an on-site sewage system on an undersized lot, which, as determined by the Department of Health through adoption of minimum land area requirements, is not large enough to protect public health and prevent environmental degradation, the applicant should not also be able to receive additional waivers from other code requirements.

As the hearing officer noted:

When looking at Section 21.4.5 and the permitting of on-site systems on undersized lots, it must be recognized that minimum land area and density are significant public health issues. It is well recognized that **even properly operating on-site systems discharge pollutants** that can be detrimental to public health at some concentration. **To address this issue public health regulations limit the**

**density of on-site sewage systems.** In Washington, new developments are limited to a maximum number of 3.5 homes per acre served by on-site sewage systems under ideal conditions. This correlates to a minimum lot size of 12,500 square feet.

Emphasis supplied. AR 43-44. Because minimum lot size is an integral component to protecting public health, interpreting “all requirements” to preclude an undersized lot applicant from obtaining additional waivers is a reasonable interpretation that best fulfills the overall intent of TCSC Article IV. The administrative hearing officer, the Board and the Court of Appeals properly ruled that Article IV, § 21.4.5 precludes a small lot applicant from obtaining a waiver from other state and county requirements.

4. ON THE FACTS OF THIS CASE, THE ADMINISTRATIVE HEARING OFFICER, BOARD OF HEALTH AND COURT OF APPEALS CORRECTLY DENIED GRIFFIN’S ON-SITE APPLICATION FOR AN UNDERSIZED LOT BECAUSE HE HAD RECEIVED WAIVERS FROM OTHER STATE AND COUNTY REGULATIONS.

Griffin presumably concedes that “all requirements” does not include waivers, because he erroneously alleges that he has not received any waivers<sup>3</sup>. However, the administrative hearing officer, and the Board made specific findings of fact that Griffin had received two waivers. AR 1; AR 38. In addition, the health officer processed these waivers pursuant

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<sup>3</sup> To the extent, Griffin implies that the waiver request was not properly processed through Article 1, his argument about process really ends up saying that his waivers are invalid because of his claimed failure of process. See Griffin’s Petition at 11.

to TCSC Article IV, § 24, and Article I, § 13. AR 9-10. Because Griffin did not challenge these findings of fact, or assign errors to these findings they are verities on appeal. *City of Olympia v. Drebeck*, 156 Wn.2d 289, 311 (2006). Furthermore, these findings of fact are supported by substantial evidence in the record.

The record reflects that Griffin requested and received two waivers. AR 18 and 21. Each of these waiver requests and approvals is attached respectively as Appendix B and C.

In one waiver application, Griffin sought relief from the County and State requirement to maintain a 10 foot separation between a water line and a septic tank. AR 21. Neither the face of the state regulation, WAC 246-272-09501(1), nor TCSC Article IV, table 10.1, allowed the health officer to reduce this separation<sup>4</sup>. Thus Griffin had to seek a waiver from this requirement. This waiver request was reviewed as a Class A waiver from state regulations and granted on March 23, 2005. AR 21.

In another waiver request, Griffin sought relief from the County

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<sup>4</sup> Griffin mistakenly argues that the "Code, on its face, provides that the applicant either must locate the disposal component ten feet from a pressurized water supply line or must install a pressurized line built in conformance with Department of Ecology Criteria. Section 10.1, fn 4." Griffin's Brief for Reconsideration at 9. While Griffin is correct that the face of the Code allows a set back reduction for a "sewerage line" built in conformance with DOE requirements, the line at issue in this waiver request is a "water" line. Contrary to Griffin's argument, the face of the Code requires a ten foot setback between the "water" line and the sewage tank. Thus Griffin was required to seek a waiver from this Code provision.

requirement to conduct a winter water study. AR 18. Similarly, the face of TCSC Article IV, § 11.4.1 did not allow the health officer to eliminate this study. Thus, Griffin had to seek a waiver from this requirement. AR 9. This waiver request was reviewed as a waiver to local health policies and not sent to the state. AR 18.

Under Griffin's own argument, and his two separate waiver requests for relief from County and State regulations, Griffin has not met "all requirements" as used in TCSC Article IV, § 21.4.5.

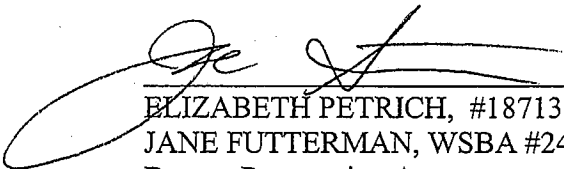
#### **IV. CONCLUSION**

The plain meaning of "all requirements" precludes an applicant for an on-site sewage system permit for an undersized lot to obtain waivers. This interpretation best comports with the Thurston County Sanitary Code's purpose of protecting public health. Because Griffin's permit did not meet all requirements, the administrative hearing officer, the Thurston County Board of Health and the Court of Appeals correctly denied

Griffin's Permit. The decision of the Court of Appeals should be affirmed.

Dated this 1 day of May 2008.

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PROSECUTING ATTORNEY

  
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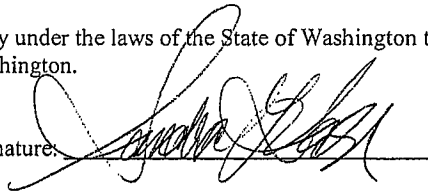
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I certify (or declare) under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct. Olympia, Washington.

Date:

May 1, 2008

Signature:





## APPENDIX

- A. Washington State Department Rule Development Committee,  
*Issue Research Report-Lot Size (Minimum Land Area)(2002).*
- B. Thurston County On-Site Sewage System Request For Waiver for  
reduction of setback from pressurized drinking water line to septic  
tank.
- C. Thurston County On-Site Sewage System Request For Waiver of  
winter water study requirement.

# **RULE DEVELOPMENT COMMITTEE ISSUE RESEARCH REPORT**

## **- LOT SIZE (MINIMUM LAND AREA) -**

DOH Staff Researcher(s): Selden Hall

Date Assigned: March 2002

Date Completed: August 2002

Research Requested by ☐ RDC ☒ TRC ☐ Other:

Issue Subject: Technical ☒ Issue ID: Issue7A  
Administrative ☐  
Regulatory ☐  
Definitions ☐

Specific WAC Section Reference, if WAC related: Section WAC 246-272-20501

### **Topic & Issues:**

#### **Lot Size (Minimum Land Area)**

##### **QUESTIONS ASKED BY THE TRC**

- Do we need to make changes in current lot size requirements?
- Where are we currently with minimum land area? What is the basis for the current requirements? What is included in lot size: land under surface water, road rights of way, steeply sloped area?
- Does minimum lot size pertain to new OSS or is it only for development of new lots?
- Should the definition of "development" be changed to distinguish between new lot development and new construction?
- Should minimum lot sizes be different for Type 1A soils?
- How does nitrate loading pertain to this topic?
- Can pretreatment to certain standards lead to reductions in minimum lot sizes?
- Should stacking of houses on side slopes be spoken to (re linear loading rates)?

##### **ADDITIONAL QUESTIONS THAT NEED ANSWERS**

- Why is lot size important?
- What does the scientific literature say about this subject?
- Based on the literature review, what should the minimum lot size be?

### **Summary:**

Minimum lot size for properties developed with on-site sewage systems has changed little in Washington state since statewide on-site rules were first established in 1974. Although the Washington lot sizes were based on the area necessary for providing adequate treatment and disposal of the sewage generated, additional lot size determinants include what is needed to fit the development and on-site sewage components onto the lot while respecting the horizontal setback requirements, and what is needed to dilute nitrogen and other contaminants discharged with the treated wastewater.

Soil type and degree of slope are not lot size determinants beyond what is needed to fit the components onto the lot. Treatment strategies can be devised to provide the necessary public health and environmental protection.

If site risk and relative importance of the aquifer for human health is not a factor, then the scientific literature indicates that minimum lot size to prevent nitrogen degradation of the groundwater is roughly 0.5 to 1.0 acres when mitigation relies on dilution. Specific treatment to remove nitrogen could allow smaller lot sizes.

The scientific literature also has many references describing the nitrogen removal capacities for various on-site technologies. Values measured range from near zero to 90% removal. Many of these reports are summarized in this paper.

See the conclusions on page 5.

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### **KEYWORDS:**

Lot size, housing density, nitrate, nitrogen, pollution prevention, recharge, population density

### **Introduction:**

In Washington state, minimum lot size is regulated in the on-site rules under WAC 246-272-20501 (Developments, Subdivisions, and Minimum land area requirements). This topic was contentious during the rule development that led to the 1995 rules and the same issues are still alive and perhaps made more salient by the ever-increasing development using on-site wastewater treatment and disposal technologies. However, before requiring additional treatment to remove nitrogen or to increase the lot size to reduce nitrogen impact, an analysis of the relative risk to human health or to downgradient surface water must be performed. Only high risk sites should be required to have larger lots or nitrogen removal treatment.

The main issues that affect minimum lot size are: (1) What is necessary to physically place the house, driveway, other development and the on-site sewage system and its reserve area on the property and still maintain the necessary setbacks? and (2) What is necessary to prevent degradation of groundwater with pollutants from the on-site system (pathogens, nitrates) and the other development on the property (impervious surfaces, landscaping fertilizers and other chemicals)?

The purpose of this review is to synthesize the literature available on the topic of minimum lot size so that the Technical Review Committee can make appropriate recommendations about this issue to the Rule Development Committee. Forty publications, which include peer-reviewed journal articles, conference proceedings and government reports were collected and reviewed. Even though the majority of the publications are conference proceedings, which are typically not peer reviewed, they provided useful information regarding this topic and many of the authors are highly respected researchers in the on-site field.

This literature review will describe what factors are used to determine minimum lot size, where we are now on this issue, and what is known from the scientific literature about the issues. In the conclusion section, a series of questions are posed for decisions by the TRC, based on the information provided.

### **Body:**

#### **FACTORS USED TO DETERMINE LOT SIZE**

The purpose of minimum lot sizes is to assure that the development structures, driveways and the on-site sewage system (including the reserve area) will physically fit on the property while complying with all the required setbacks. At the same time, the goal of an on-site sewage system is to treat and dispose of wastewater in a manner which protects public health and the receiving environment. During our work on Technical Issue 4 (Disposal Component Reductions – Highly Pretreated Effluent), we found that properly designed, sited and installed and maintained on-site systems will remove bacterial and viral pathogens before the effluent reaches the groundwater. Remaining contaminants such as nitrates, chlorides and any organic solvents placed into the system usually depend on dilution to protect the groundwater. Lot size will affect the amount of dilution of the remaining contaminants in the effluent as it leaves the soil envelope before, or as it mingles with, the groundwater. Lot size also influences what other contaminants are added to the groundwater through gardening, fertilizer use, etc. Another factor that has been used in establishing lot size for properties developed with on-site sewage systems is a de facto approach to land use planning.

The lack of site-specific data and the inappropriate use of on-site sewage regulation for land use regulation have resulted in very arbitrary requirements for minimum lot size. In addition, on-site rules rarely are adjusted for performance capabilities of the wastewater treatment system used (EPA 2002).

#### **WHERE WE ARE NOW**

Currently in Washington state, WAC 246-272 establishes the minimum land area requirement for on-site sewage treatment disposal at 12,500 ft<sup>2</sup>, although local health officers may issue a permit for smaller lots of record created prior to the 1995 rules if all other requirements of the WAC 246-272 can be met. When Method I is used, the total gross land area of a lot is included in the required minimum land area for a given soil type and source of drinking water. This area includes steeply sloped portions and area under surface water. When Method I is used

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for determining minimum lot size, the size varies depending on whether the water supply is public or on-lot, and also depending on soil type. When Method II is used, an analysis of 15-20 factors is required and in no case may the lot size be smaller than 12,500 ft<sup>2</sup> or 3.5 unit volumes of sewage per acre, and must exclude area under surface water. However, exceptions are allowed for lots with OSSs within the boundaries of a recognized sewer utility having a finalized assessment roll and for planned unit developments that meet a series of requirements. This set of minimum lot sizing criteria was based on what was needed to properly treat and dispose of the sewage and on the ability to fit the necessary items on the lots while meeting setback requirements.

During the last rule revision, the process bogged down for a while due to a large difference in perceptions of what was necessary for public health and for environmental protection from nitrogen and other entrained pollutants. In the end, the nitrogen issue was tabled and the rules moved forward without resolving the nitrate issue. Values for minimum land area were essentially unchanged from the previous version of the rules, dated 1983, which were a refinement of the values put forth in the first state-wide on-site rules dated 1974. Clearly the issue of nitrogen contamination of the groundwater has played a role in each of the rule development processes, and the increase in numbers of systems over the last 25 years raises the importance of addressing nitrogen loading to the groundwater from on-site wastewater systems.

Another, less important detail regarding lot size was added to the 1995 rules. These rules allowed a health officer to include the area to the centerline of a road or street right-of-way in the minimum land area calculation when certain criteria are met.

Currently, lots on Type 1A soils are not required to be overly large unless a conventional gravity sewage system is used. It is well recognized that the capacity of these soils to remove pathogens is poor to none. Therefore, the on-site rule specifically requires some form of treatment to remove pathogens before releasing the effluent to Type 1A soil. The Technical Issue paper devoted to Type 1A soils raises concerns about the adequacy of the current horizontal separation distances to retain viruses in these soils. Nitrogen is typically handled by dilution and therefore is handled no differently in Type 1A than in other soils.

The scientific literature on the subject of lot size falls roughly into two categories: (1) minimum lot size necessary to prevent groundwater degradation and (2) how to remove nitrates with on-site technology to allow smaller lots. A small third category relates to pathogen contamination of the groundwater, but this topic was adequately addressed with Technical Issue #4.

### **LOT SIZE TO PREVENT GROUNDWATER DEGRADATION**

For soil absorption systems in sands, the only active natural mechanism for reducing nitrate concentration in wastewater is dilution with uncontaminated groundwater and rainfall additions on the property (Walker et al. 1973). A study reported by Holzer (1975) describes that the suitability of an area for the use of conventional septic tank systems was found to be a function of potential leaching field failure, groundwater contamination, and population density. A particular example discusses the hill area of eastern Connecticut.

Mathematical modeling studies have been proposed for determining minimum lot size, with guarded results. For example, a linear program model, which can relate distributions of regional ground-water quality to corresponding development scenarios, was applied to a sub area of Cape Cod, MA, starting with 1980 data and projecting future allowable growth patterns. Elemental water quality, elemental housing density, nondegradation water quality standards, the 1980 land-use pattern, and a projected development population are incorporated as constraints. The analysis elucidates optimal development distributions that produce a minimum ground-water-quality impact (Bauman and Schafer 1984). Perkins (1984) presents three mathematical models to predict lot size for limiting nitrate-nitrogen concentrations in groundwater. From these models, minimum lot size to provide minimum reasonable protection is 0.5 to 1.0 acre based on reported data and 0.75 to 1.0 acre based on models. Pizor, et al (1984) use a current planning capacity model for determining the number of habitants or dwellings that an area can support based on yield of potable groundwater and aquifer dilution capacity of nitrates. No numerical outcomes are given. The lot sizes determined from these studies do not take into consideration the risk to human health or degradation of downgradient surface water. Therefore such sizes would be recommended for the high risk sites and smaller sizes could be allowed for lower risk sites.

In review articles, Brown and Bicki (1987) and Bicki and Brown (1991) conclude that most studies on the correlation between groundwater contamination and OSS density estimate a minimum lot size necessary to ensure against contamination is roughly 0.5 to 1 acre. Kaplan (1988) quotes other authors about the utility of

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mathematical models for this issue: "The only conclusion to be drawn concerning the applicability of sophisticated ground water models to the problem of septic tank systems is that the utility of the models may be outweighed by their significant data requirements." He also credits another pair of authors, Bauman and Schafer, for having calculated that the nitrate standard would be exceeded if the lots were less than 1 to 2 acres and the groundwater moved less than 31 meters per year. Kimsey (1997) describes a methodology for estimating nitrate impacts to groundwater from on-site systems, but does not provide numerical data. Hantzche and Finnemore (1993) have developed a method for estimating long-term increases in groundwater nitrate caused by on-site sewage systems. The method has limited data requirements and uses straightforward computations. Comparisons of predicted values with actual field sampling data for several case study locations in California confirmed that the method provides reasonable first approximations of nitrate-nitrogen effects in groundwater from on-site systems. The major data input for this method is the amount of rainfall recharge and the model then predicts the resultant nitrate concentration for a given ratio of wastewater recharge to rainfall recharge. Using data from Olympia, which has an average rainfall of 45 inches per year, and assuming an average family of 3 (50 gal/capita) and a recharge rate of 75%, the total land area requirement would be 13,082 ft<sup>2</sup>. If the recharge rate were 50%, then the area requirement would rise to 19,624 ft<sup>2</sup>. At 40% recharge (Kimsey personal communication), the minimum land area would be 24,530 ft<sup>2</sup>, or 0.56 acres.

Lichtenberg and Shapiro (1997) used data on NO<sub>3</sub> and hydrological characteristics of drinking water wells to relate land use practices to well water quality. They found that one on-site system is associated with about as much nitrogen leaching as one hectare (2.47 acres) of cornfield. Therefore, if conversion of a cornfield to residential use with on-site sewage is at a density of less than 1 on-site per hectare, the result will be lower N concentrations in the drinking water wells. Conversely, if the conversion is at a higher density of residences, there will be higher N concentrations in the drinking water wells. Tuthill and Meikle (1998) found a negative correlation between lot size and bacterial and nitrate contamination of wells, which means as lots get smaller, contamination increases. A recommended lot size is not given. Washington State Department of Ecology (2000) suggests a density of one on-site system per acre is sufficient to avoid ground water contamination. As stated previously, the lot sizes determined from these studies do not take into consideration the risk to human health or degradation of downgradient surface water. Therefore such sizes would be recommended for the high risk sites and smaller sizes could be allowed for lower risk sites.

Since minimum lot size is designed to protect public health and prevent environmental degradation, in terms of protecting these assets, it does not matter whether the lot is one of record or has been newly created.

## HOW TO REMOVE NITRATES WITH ON-SITE TECHNOLOGY

Since nitrogen contribution to the groundwater is perhaps a major determinant of lot size where the risk to human health and / or downgradient surface waters is high, one way to avoid larger lot sizes is to remove the nitrogen before it reaches the groundwater. A number of studies have been published on nitrogen reduction processes for on-site sewage systems.

The usual process for reducing nitrogen is to nitrify the element in an aerobic process and then denitrify in an anaerobic process in the presence of a carbon source. Gold et al (1989) describe high levels of denitrification using anaerobic rock filters following aerobic sand filters, with the carbon source added to the anaerobic filters as either alcohol or gray water. Ball (1994) describes several methods of nitrogen removal. In one case, he reports up to 55% denitrification in a single-pass intermittent sand filter (ISF), depending on temperature. In addition, he reports further loss of nitrogen when the ISF effluent is placed in the biologically active topsoil stratum. He further reports results from some experimental systems where septic tank effluent is pumped continuously from the discharge end of the tank to a small trickling filter located over the inlet tee from which it drops back into the tank. The recirculation rate is low enough to maintain substantially anaerobic conditions in the septic tank. One septic tank so equipped discharges effluent that is markedly improved over untreated septic tank effluent. Biochemical oxygen demand is reduced by 92%, total suspended solids by 82%, and total nitrogen by 77%. When this relatively high-quality effluent is then dosed to an upflow filter, it is largely denitrified, so that less than 5 mg-N/L is discharged to the environment.

Boyle et al (1994) report on the results of an on-going field evaluation of several promising technologies for on-site nitrogen removal. A single field station with four parallel field-scale systems was built to provide side-by-side evaluations of recirculating sand filter-upflow anaerobic systems and peat filters. The anaerobic upflow-recirculating sand filter system has produced high quality effluent with low BOD and suspended solids. Total nitrogen concentrations below 15 mg/l as N were typically attainable. The peat filters produced high quality

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effluent with respect to BOD and solids but nitrogen removal to date has not been acceptable. Bruen and Piluk (1994) report on 3 variations of small recirculating sand filters that were monitored for effluent quality. One of these systems was able to remove 66% of the total nitrogen. Converse et al (1994) collected and analyzed soil samples from beneath and beside 13 mound systems. The nitrogen reduction as the effluent left the influence of the mound averaged 36%. Although this reduction was significant, the remaining nitrate is still 3.5 times higher than the MCL of 10 mg/L.

McKee and Brooks (1994) report nitrogen reductions through peat filters ranging from 21% to 82%. For systems serving residences, the numbers range from 36% to 83.6% removal with most of them averaging in the 5 to 13 mg/l range. The authors describe that the source of the peat is critical to high system performance. Mote and Ruiz (1994) report results from a laboratory study that employed 12 bench scale systems set up so that various combinations of the three variables could be studied. They found that a sand depth of 16.5 cm (6.5 inches) and a sand filter surface loading rate of 40.7 cm/day (9.9 gal/ft<sup>2</sup>/day) of septic tank effluent was indicated as optimum for maximum nitrogen removal in a system combining a recirculating sand filter with an anaerobic upflow fixed-film reactor. Nitrification in the aerobic sand filter was enhanced by increased sand depth and reduced loading rate, whereas denitrification in the anaerobic fixed-film reactor was enhanced by reduced sand depth in the sand filter. Thus, recirculation sand filter systems can be operated in a manner that will promote appreciable removal of nitrogen from septic tank effluent without addition of external sources of energy to fuel denitrifying microbes. However, conditions for optimal nitrogen removal may not achieve satisfactory carbon removal (approximately 55%).

Osek, Shaw and Graham (1994) report good nitrogen removal from two recirculating sand filter/denitrification systems. Samples were taken from the septic tank, sand filter, dosing chamber, and monitoring wells adjacent to the drainfields. One system discharged by gravity to a standard drainfield and one discharged to a mound. Nitrogen removal of at least 60% to 70% was achieved with these systems. Shaw and Turyk (1994) evaluated 14 pressure-dosed drainfields in sandy soils (1 at-grade, 6 standard PD, and 7 mound systems). The measured nitrate in the downgradient plume as well as the nitrogen to chloride ratios indicate that good bacterial removals were being achieved, but the systems did very little in the way of nitrogen removal. Loomis et al (2001) tested a variety of treatment systems for BOD<sub>5</sub>, TSS, fecal coliform and total nitrogen. They found the nitrogen removal varied from 0 to 38%, depending on the system. The best removals were by recirculating systems. EPA (2002) summarizes current knowledge and lists some expected sustainable performance ranges for the most likely combinations of nitrogen removal processes. The percent removals are from 40 to 80%.

Mannion (1990) proposes the use of natural zeolites to mitigate nitrate pollution from on-site sewage systems. He asserts that zeolite absorbs the nitrate precursor, ammonium, at the source, and prevents nitrogen pollution effectively and inexpensively. He would merely substitute zeolite for the rock in drainfields and expects up to 90% removals. He reports that 10 yd<sup>3</sup> of zeolite would have enough exchange capacity to absorb ammonium from the effluent of a typical 2-bedroom house for 24 years at 100% efficiency and 30 years at 80% efficiency.

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#### Cost Information:

The cost of larger lots or of not being able to develop an existing lot must be balanced with the cost of removing the contaminant that is forcing larger lot sizes. Nitrogen removal may add no cost to a system, or may add several thousand dollars, depending on what system for treatment is selected and how much nitrogen must be removed. Recirculating systems can remove significant amounts of nitrogen if the retention times and recirculating ratios are correctly selected. The recirculating systems may already be needed to meet some of the non-nitrogen parameters of the site. However, if an aerobic system or single-pass ISF is selected to meet the other parameters of the site, additional treatment processes must be added to reduce the nitrogen loading to the groundwater when needed, and in that case, considerable additional expense may be incurred.

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#### Conclusions:

1. The minimum lot sizes for development with on-site sewage systems must meet two criteria: all the development (buildings, driveway, other pavement) and the sewage system must physically fit on the lot while maintaining the required setbacks and b) the lot must support the development without degrading the groundwater with nitrogen additions.
2. The minimum lot sizes in the 1995 version of WAC 246-272 are adequate for the physical placement of the structures and wastewater treatment system on the lot.

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3. Larger lot sizes or nitrogen removal treatment should only be used for sites with high risk to human health or to downgradient surface water.
  4. Mitigation of the nitrogen pollution of the groundwater with dilution will require lot sizes between 0.5 and 1 acre.
  5. Several treatment technologies exist for removal of nitrogen from the on-site sewage train. Depending on the treatment chosen and therefore the amount of nitrogen removed before disposal, smaller lot sizes may be allowed as the nitrogen concerns are mitigated with removal processes before release to the groundwater. However, none of these treatment technologies has been tested under a recognized testing protocol.
  6. Lot size should apply to existing lots as well as new lots if degradation of the receiving environment is an issue, since the degradation will occur regardless of when the lots are created.
  7. Lot sizes for Type 1A soils should not differ from other soil types in terms of bacterial pathogens and nitrates, because there is little or no treatment rendered by this soil regardless of lot size. Adequate pretreatment for these contaminants must be designed into the system. However, the adequacy of these soils to retain and inactivate viruses is questionable and the current horizontal separation distances may not provide the needed protection. See the Issue Paper on Type 1A soils for more information.
  8. Stacking of systems or houses on side slopes is not so much an issue of lot size as it is of soil depth. Therefore, this issue should be addressed elsewhere.
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## SECTION I.

COMPLETED BY APPLICANT

Name: (1) Jeff Griffin  
 Address: 9612 Mariner Dr. NW  
Olympia, WA 98502  
 Telephone: (360) 402 5207  
 Signature: [Signature]

Thurston County Health Department  
 2000 Lakeridge Drive SW.  
 Olympia, WA 98502

Property Identification: (2) LOT 11 Steamboat Island T.P.N. # 76200001100

## SECTION II.

COMPLETED BY APPLICANT

Regulation Number: (3) <u>WAC 246-272-09501 (1)</u>	Regulation Requirement: (4) <u>TANK 10 FEET FROM PRESSURED WATER SUPPLY LINE</u>	Waiver Sought: (5) <u>as 3/21/05</u> <u>REDUCE TO 5' FROM EDGE OF TANK TO PRESS. WATER LINE</u>
Article IV, Section 10.1 <u>TANK</u>		

Justification (Mitigation measures to be provided): (6)

WATER PROOFING TANKS, FLEX COUPLINGS AT TANK CONNECTIONS, TANK  
 LEAKAGE TEST, ACCESS AT OR ABOVE FIN. GRADE, W/ SLEAVED WATER LINE

## SECTION III.

COMPLETED BY HEALTH OFFICER

Review Criteria (7)	Mitigation Measures (in addition to those proposed) (8)
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CLASS A WAIVER, TABLE OF MITIGATING MEASURES

Comments/Conditions: (9)

Type of Waiver: (10) ☒ Class A ☐ Class B ☐ Class C - Request DOH review before granting? Yes ☐ No ☒

Neighbor Notification: (11) Required? Yes ☐ No ☒  
 If needed, are agreements, easements, etc. properly filed? Yes ☐ No ☐

## SECTION IV.

COMPLETED BY HEALTH OFFICER

This Request For Waiver From Regulations has been reviewed according to the provisions of Chapter 246-272 WAC and Article IV On-Site Sewage Systems. The review criteria applied, and the mitigation measures proposed and/or required, have been evaluated, their ability to provide public health protection at least equal to that provided by this chapter WAC and/or Article IV.

☒ Approved/Granted - Subject to all comments, conditions and requirements noted in Section II and III.  
☐ Denied.

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APPENDIX B

Date: 3/23/05



**SECTION I** COMPLETED BY APPLICANT

Name: (1) LANE SATER FOR JEFF GRIFFIN  
Address: REPRESENTATIVE - SKILLINGS-CONHOLLY  
5016 LACEY BLVD SE  
LACEY, WA 98503  
Telephone: (360) 491-3399  
Signature: Jane C. Sater

JUN 28 2004

Thurston County Health Department  
2000 Lakeridge Drive SW  
Olympia, WA 98502

Property Identification: (2) LOT 11 OF STEAMBOAT ISLAND, TPN  
76200001100, WINTER WATER STUDY 03110906 MB

**SECTION II** COMPLETED BY APPLICANT

Regulation Number: (3) WAC 246-272- Article IV, Section 11.4.1	Regulation Requirement: (4) GUL EH-WWS-001 POL EH54-003 PRO EH54-203	Waiver Sought: (5) WAIVER OF WINTER WATER STUDY REQUIREMENT
Justification (Mitigation measures to be provided): (6) <u>ADDITIONAL INFORMATION TO</u> <u>BE PROVIDED BY PACIFIC RIM SOILS &amp; WATER</u>		

**SECTION III** COMPLETED BY HEALTH OFFICER

Review Criteria (7) <u>SOIL SCIENTIST REPORT</u> <u>YCEA SITE REVIEW</u>	Mitigation Measures (in addition to those proposed) (8)   
Comments/Conditions: (9) <u>WAIVER TO LOCAL HEALTH POLICIES, NOT SENT TO STATE.</u>	

Type of Waiver: (10) <input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B <input type="checkbox"/> Class C-Request DOH review before granting? Yes <input type="checkbox"/> No <input type="checkbox"/>
Neighbor Notification: (11) Required? Yes <input type="checkbox"/> No <input type="checkbox"/> If needed, are agreements, easements, etc. properly filed? Yes <input type="checkbox"/> No <input type="checkbox"/>

**SECTION IV** COMPLETED BY HEALTH OFFICER

This Request For Waiver From Regulations has been reviewed according to the provisions of Chapter 246-272 WAC and Article IV On-Site Sewage Systems. The review criteria applied, and the mitigation measures proposed and/or required, have been evaluated for their ability to provide public health protection at least equal to that provided by this chapter WAC and/or Article IV.

☒ Approved/Granted-Subject to all comments, conditions and requirements noted in Section II and III.

☐ Denied.

Local Health Officer (12) Randal J. Malby

Date: 10/25/04